Ordering number : EN595C



Monolithic Linear IC

LA1130

AM Tuner for Car Radio

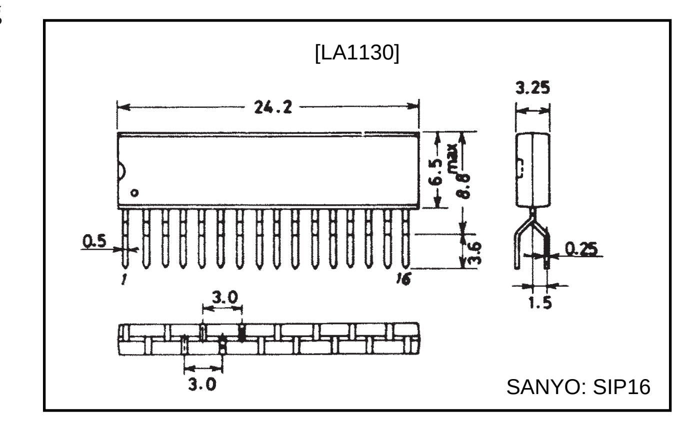
Overview

The LA1130 is an IC developed for AM tuner systems in car radio applications. It provides low-level local oscillation so that it can be applied in varactor diode tuning applications as well as μ tuning applications.

Package Dimensions

unit: mm

3020A-SIP16



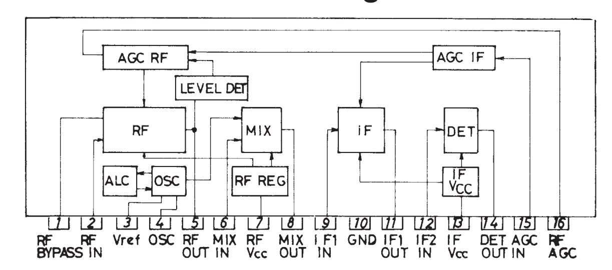
Functions

- RF amplification
- MIX
- OSC (with ALC)
- IF amplification
- Detection
- AGC (normal)
- RF wide-band AGC
- Others

Features

- Good space factor due to single-end package.
- Easy to design printed circuit pattern due to 3mm-pitch pin interval.
- Double-balanced type MIX : Improvement in IF interference, spurious interference.
- Normal AGC : Less variation in detector output to input.
- RF wide-band AGC : Improvement in cross modulation distortion, especially strong input characteristics in varactor diode tuning applications because of low operating level (300mVrms).
- AGC drive output for FET : Possible to apply AGC to FET at input stage in varactor diode tuning applications.
- ALC at OSC stage : Improvement in tracking error due to stabilized low-level (350mVrms) oscillation output in varactor diode tuning applications.
- Reference voltage output : Possible to use 5.6V reference voltage for other bias (FET, etc.).
- V_{CC} variation compensation : Less variation in gain, distortion, etc. (7.5 to 16V)
- Less ripple voltage : Less modulation of carrier by supply voltage ripple.
- Low pop noise : Possible to reduce pop noise at the time of V_{CC}-on, mode-on by selecting AGC time constant.

Equivalent Circuit Block Diagram



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Specifications

Maximum Ratings at Ta=25°C, See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max	Pins 7, 13	16	V
Maximum output voltage	V_{O5}	Pin 5	17	V
	$V_{O8, 11}$	Pins 8, 11	24	V
Maximum input voltage	V_{IN} max	Pin 2	5.6	V
Maximum supply current	I_{CC} max	Total of current at pins 5, 7, 8, 11, 13	35	mA
Maximum flow-out current	I_3	Pin 3	6	mA
Allowable power dissipation	Pd max	Ta≤45°C	520	mW
Operating temperature	Topr		–20 to +70	°C
Storage temperature	Tstg		–40 to +125	°C

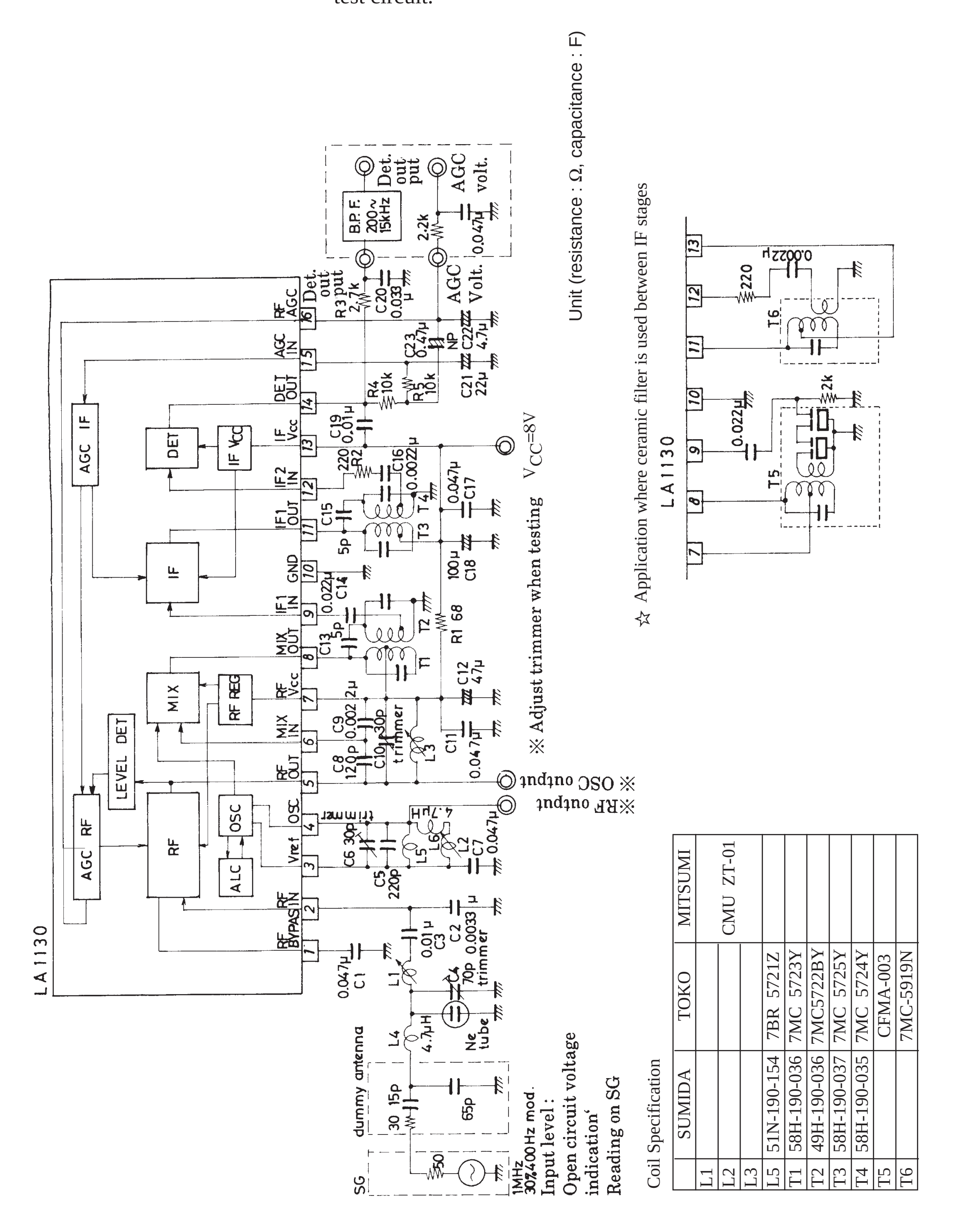
Recommended Operating Condition at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		7.5 to 14.0	V

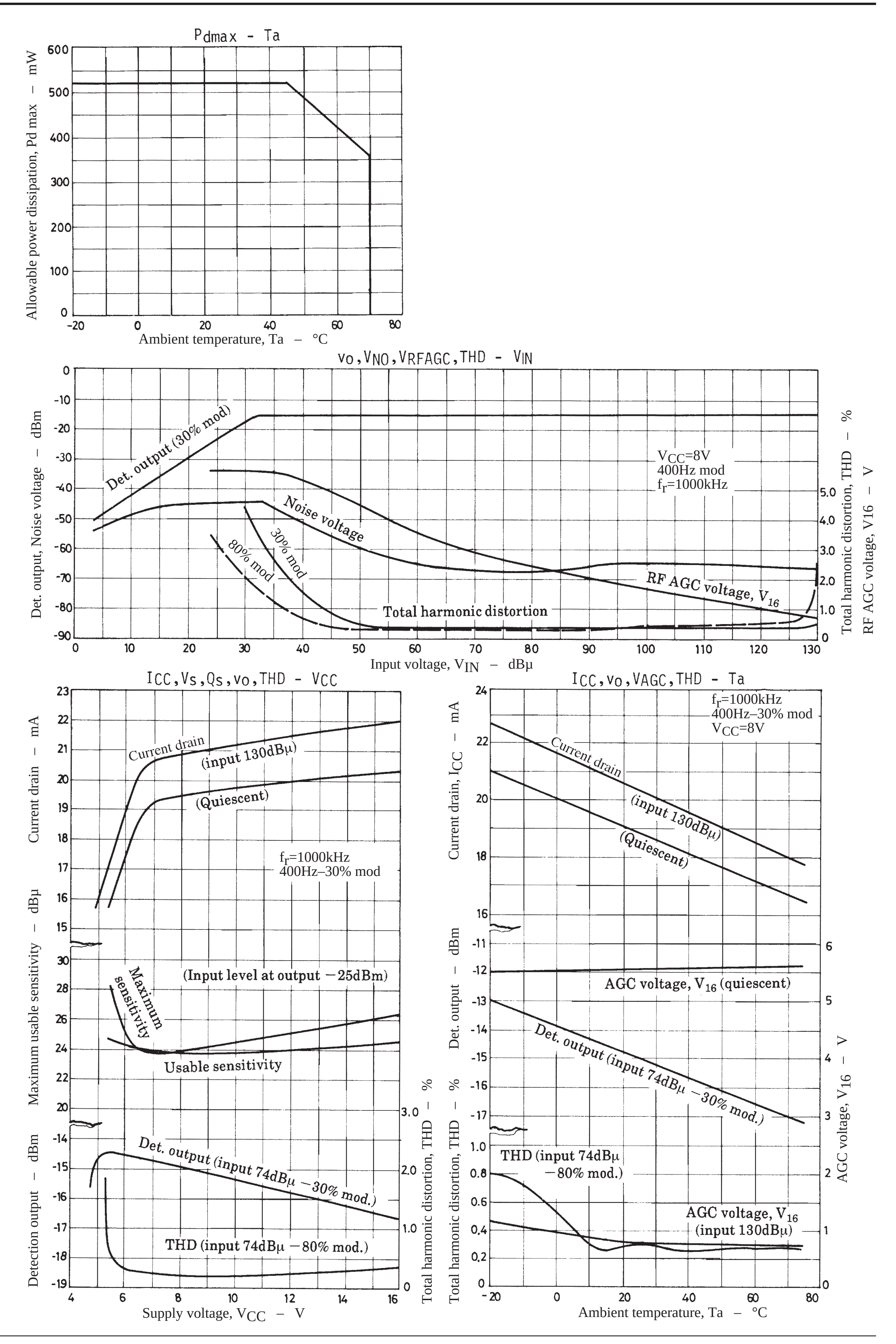
Operating Characteristics at Ta=25°C, V_{CC}=8V, f_r=1MHz, f_m=400Hz, See specified Test Circuit.

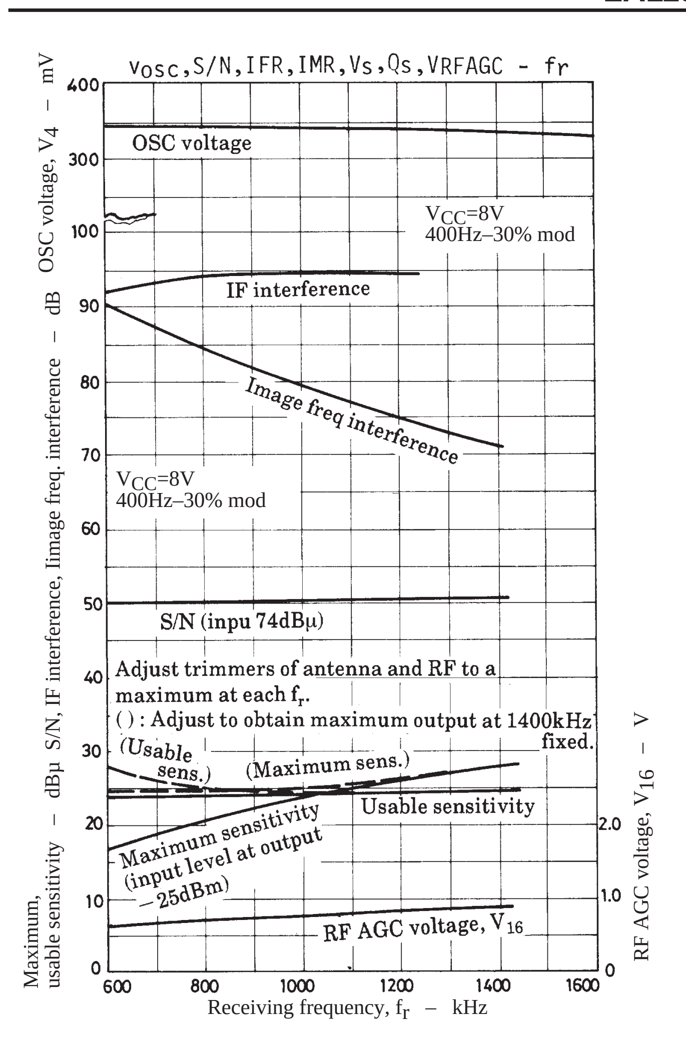
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	$I_{CC}1$	Quiescent	12.5	18.0	24.5	mA
	$I_{CC}2$	120dBµ input	14.0	20.0	26.5	mA
Detection output	V_O1	24dBµ input, 30% mod.	–31.0	–26.5	–12.0	dBm
	V_O2	74dBµ input, 30% mod.	–18.0	–15.5	–12.0	dBm
Signal to noise ratio	S/N 1	24dBµ input, 30% mod.	16	20		dB
	S/N 2	74dBµ input, 30% mod.	46	50		dB
Total harmonic distortion	THD1	74dBµ input, 30% mod.		0.35	1.0	%
	THD2	74dBµ input, 80% mod.		0.35	1.5	%
	THD3	120dBµ input, 30% mod.		0.35	2.0	%
RF AGC voltage (V_{16})	V_{RFAGC1}	Quiescent	5.2	5.6	5.9	V
[Reference characteristics]						
Signal to noise ratio	S/N 3	35dBµ input, 30% mod.		31		dB
Total harmonic distortion	THD4	128dBµ input, 80% mod.		0.58		%
Detection output variation	ΔV_O	V_O(128dBµ)/V_O(74dBµ)		0.4		dB
Bandwidth (6dB)	BW_6	6dB width, 15dBµ input 30% mod.		7		kHz
(60dB)	BW_{60}	60dB width, 15dBµ input 30% mod.		30		kHz
Selectivity (1 signal)	ACA	±10kHz detuning, 15dBµ input, 30% mod.		40		dB
Ripple rejection ratio		100dBµ input, IF VCC (pin 13) ripple level 50Hz to 15dBm		40.5		dB
Local oscillation voltage	Vosc			350		mVrms
Local osc drift	ΔVosc	VoscL(515kHz) to VoscH(1660kHz)		20		mVrms
Whistle	$2f_{iTweet}$	74dBµ input, 400Hz beat max.		–33		dB
RF AGC voltage (V_{16})	V_{RFAGC2}	120dBµ input		1		V
RF output voltage	V_{ORF}	100dBµ input, ±10kHz		300		mVrms
IF interference		fr=600kHz, 15dBµ input		91.5		dB
Image frequency interference		fr=1400kHz, 15dBµ input		70.5		dB

Sample Application Circuit (excluding the area bounded by the dotted line) / also used as characteristics test circuit.



	SUMIDA	TOKO	MITSUMI
L1			CMU ZT-01
L2			
L3			
L5	51N-190-154	7BR 5721Z	
T1	58H-190-036	7MC 5723Y	
T2	49H-190-036	7MC5722BY	
T3	58H-190-037	7MC 5725Y	
T4	58H-190-035	7MC 5724Y	
T5		CFMA-003	
T6		7MC-5919N	


Pdmax - Ta
Allowable power dissipation, Pd max – mW
Ambient temperature, Ta – °C
vo,VNO,VRFAGC,THD - VIN
Det. output (30% mod)
Noise voltage
30% mod
80% mod
RF AGC voltage, V16
Total harmonic distortion
VCC=8V
400Hz mod
fr=1000kHz
Det. output, Noise voltage – dBm
Total harmonic distortion, THD – %
RF AGC voltage, V16 – V
Input voltage, VIN – dBμ
ICC,Vs,Qs,vo,THD - VCC
Current drain
(input 130dBμ)
(Quiescent)
fr=1000kHz
400Hz–30% mod
(Input level at output −25dBm)
Maximum sensitivity
Usable sensitivity
Det. output (input 74dBμ −30% mod.)
THD (input 74dBμ −80% mod.)
Current drain – mA
Maximum usable sensitivity – dBμ
Detection output – dBm
Total harmonic distortion, THD – %
Supply voltage, VCC – V
ICC,vo,VAGC,THD - Ta
fr=1000kHz
400Hz–30% mod
VCC=8V
Current drain
(input 130dBμ)
(Quiescent)
AGC voltage, V16 (quiescent)
Det. output (input 74dBμ −30% mod.)
THD (input 74dBμ −80% mod.)
AGC voltage, V16 (input 130dBμ)
Current drain, ICC – mA
Det. output – dBm
Total harmonic distortion, THD – %
AGC voltage, V16 – V
Ambient temperature, Ta – °C



This catalog provides information as of September, 1997. Specifications and information herein are subject to change without notice.